CLAIMS

What is claimed is:

1. A Method for screening biological sample for the presence of the metabolic syndrome in the sample donors, the method comprising :
   a) irradiating the biological sample by radiation;
   b) capturing the radiation which has interacted with the biological sample;
   c) evaluating the captured radiation for spectral characteristics; and
   d) classifying the biological sample according to the presence of the metabolic syndrome based on the biological sample's spectral characteristics.

2. Method according to claim 1, wherein the radiation is infrared radiation in the wavelength range of 2.5 to 25 micrometer.

3. Method according to claim 1, wherein the radiation is visible or near infrared radiation in the wavelength range of 0.4 to 1.5 micrometer and the type of interaction is Raman scattering.

4. Method according to claim 1, wherein the biological sample is blood or a blood derivative as plasma or serum.

5. Method according to claim 1, wherein the biological sample is applied to a sample carrier prior to step of irradiation.

6. Method according to claim 1, wherein the biological sample is dried prior to step a).

7. Method according to claim 1, wherein the biological sample is applied to a flow cell prior to irradiation with a small thickness preferable in a range of 6 to 30 μm.

8. Method according to claim 1, wherein the captured radiation is reflected or transmitted infrared radiation or Raman scattered radiation.

9. Method according to claim 5, wherein the carrier has a reflective surface.

10. Method according to claim 5, wherein the carrier has an infrared-transmissive plastic foil.

11. Method according to claim 1, comprising the following training steps for said classification:
performing steps a) and b) with samples of known classification; and
training an evaluation program so that it assigns the samples to the known classifications.

12. Method according to claim 11, wherein a reference database is generated from the biological samples of known classification.

13. Method according to claim 11, wherein parameters of a an evaluation function are set during the training.

14. Method according to claim 1, wherein the classification involves the application of an evaluation function with predetermined parameters to the spectral characteristics of the biological sample of unknown classification.

15. Method according to claim 1, wherein the classification comprises a multivariate evaluation.

16. Method according to claim 1, wherein the evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 1500 to 1800 wavenumbers (region II).

17. Method according to claim 1, wherein said evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 2300 to 3200 wavenumbers (region III).

18. Method according to claim 1, wherein said evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 1000 to 1300 wavenumbers (region I).

19. Method according to the claims1, wherein the evaluation uses spectral information from molecular vibration frequencies of the following combinations:
vibration in region 1500 to 1800 wavenumbers and 2300 to 3200 wavenumbers
vibration in region 1000 to 1300 wavenumbers and 2300 to 3200 wavenumbers
vibration in region 1000 to 1300 wavenumbers and 1500 to 1800 wavenumbers
vibration in region 1000 to 1300 wavenumbers, 1500 to 1800 wavenumbers and 2300 to 3200 wavenumbers.

20. A System for screening biological samples for the presence of the metabolic syndrome in sample donors, comprising:
a) a radiation source for irradiating the sample;
b) a detector for capturing radiation which has interacted with the sample;
c) an evaluation unit for evaluating the captured radiation for spectral characteristics;
d) a classification unit for classifying the sample according to the presence of the metabolic syndrome based on the spectral characteristics.

21. System according to claim 20, further comprising a sample carrier onto which sample is applied prior to irradiation.

22. System according to claim 21, wherein the carrier has a diffusely reflective surface.

23. System according to claim 20, comprising a flow cell into which a sample is applied prior to radiation.

24. System according to claim 20, wherein the radiation source and the detector are arranged to perform infrared absorption measurement or Raman scattering measurement.

25. System according to claim 20 wherein the classification unit comprises a microprocessor and a program unit being programmed to perform the classification.

26. System according to claim 25, wherein the program unit being programmed with a multivariate evaluation based on parameters determined on samples of known classification.